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Zylbert

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[54] **GEAR ATTACHING ARRANGEMENT FOR LOOPTAKER DRIVE SHAFT**

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[51] **Int. Cl.**[3] **D05B 57/32**

[52] **U.S. Cl.** **112/228**; 403/362

[58] **Field of Search** ..... 112/181, 182, 183, 184, 112/191, 228, 230, 186 (U.S. only); 403/362, 366, 372

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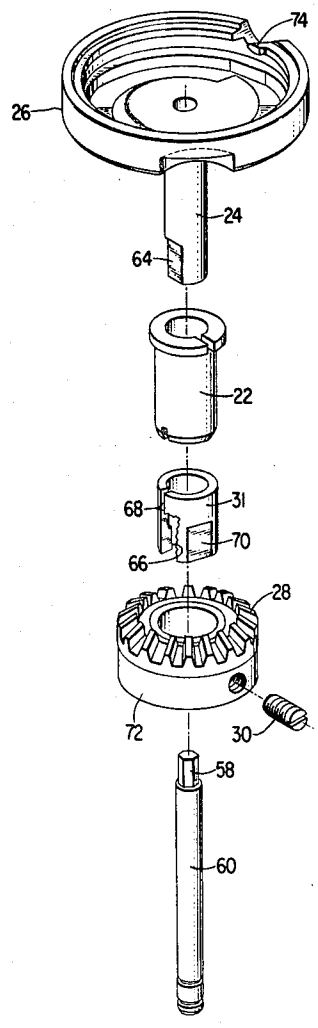
[57] **ABSTRACT**

A hollow looptaker shaft which has a spindle rotatable therein and which is of a material susceptible to local deformation under pressure is fitted with a steel sleeve that is prevented from rotating relative to the shaft, and a gear for use in rotating the shaft is affixed to the sleeve with a set screw.

4 Claims, 3 Drawing Figures



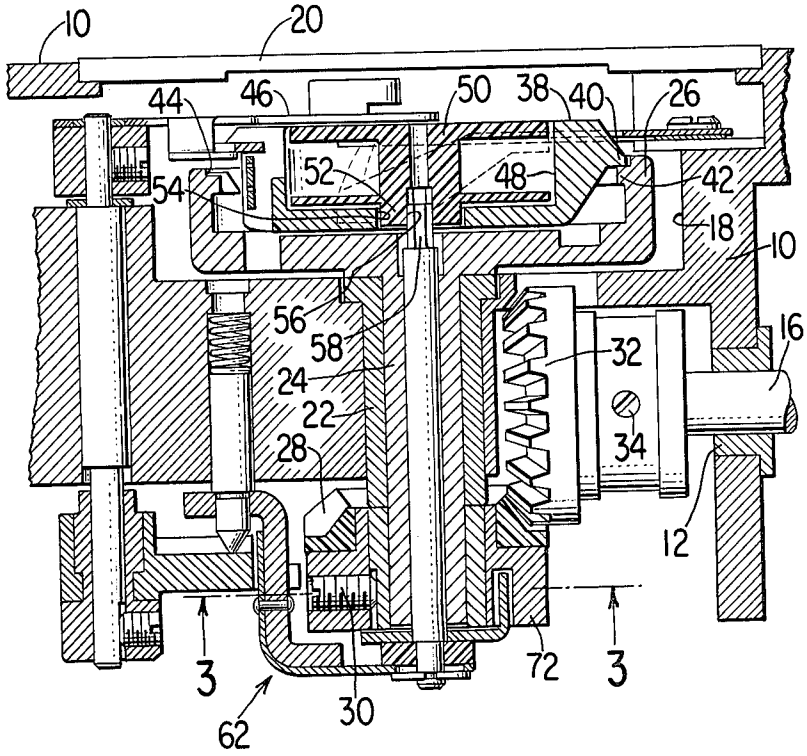


Fig.1

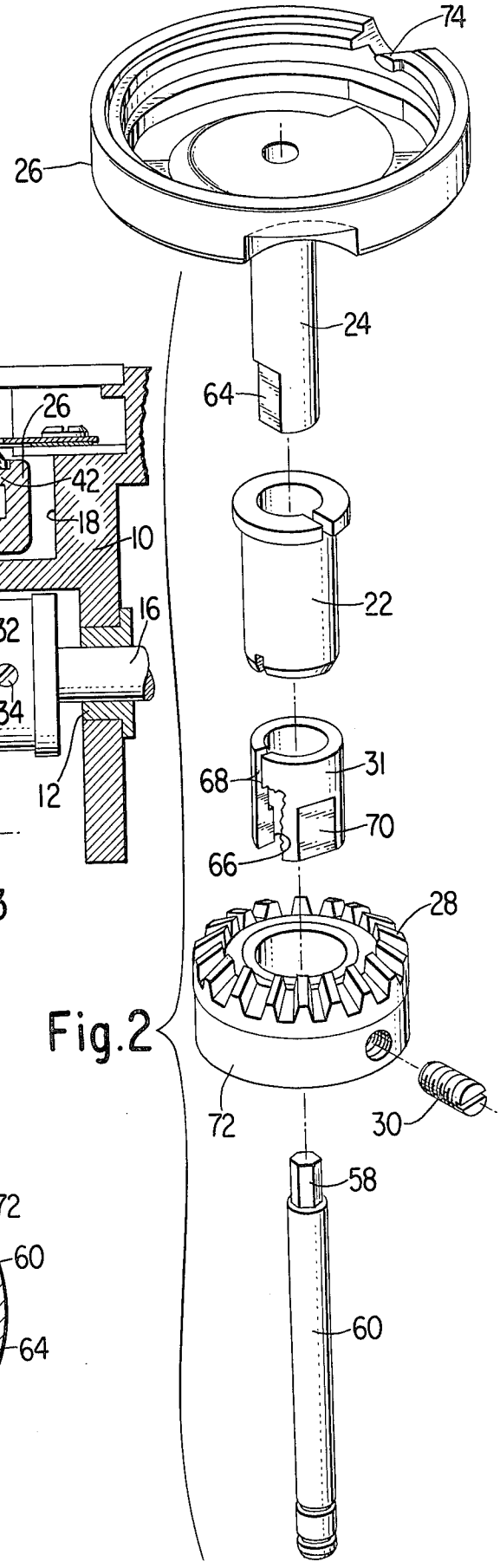


Fig.2

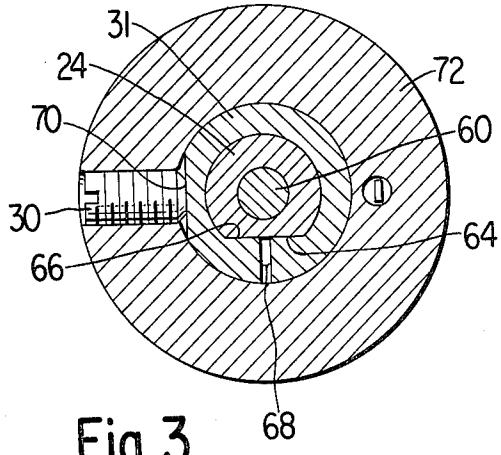


Fig.3

GEAR ATTACHING ARRANGEMENT FOR LOOPTAKER DRIVE SHAFT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to sewing machine looptakers, and more particularly to arrangements for affixing a drive gear to a looptaker shaft.

2. Description of the Prior Art

It has been a common practice to secure a drive gear directly to the depending shaft of a sewing maching looptaker with a set screw as in the manner shown for example, in U.S. Pat. No. 3,242,891 for "Stitch Forming Drive Mechanism" of E. W. Bialy, issued Mar. 29, 1966, and in U.S. Pat. No. 3,693,566 for "Bobbin Thread Replenishing Mechanism for Sewing Machines" of S. J. Ketterer, issued Sept. 26, 1972.

In sewing machines provided with bobbin replenishing mechanism including a rotatable spindle within a hollow looptaker shaft as disclosed in the aforementioned U.S. Pat. No. 3,693,566, the use of a set screw for affixing a gear to the looptaker shaft is feasable if the shaft is of a material such as steel which is sufficiently resistant to deformation under the screw to prevent the shaft from being indented by the screw and interfering with the operation of the spindle. However, it is often desirable to use a material such as zinc or a plastic which is less resistant to localized pressure and with which the looptaker and shaft can be cheaply cast or molded into an integral structure requiring little or no machining.

It is a prime object of the present invention to provide the means for affixing a gear to a locally deformable cast or molded hollow looptaker shaft without affecting the freedom of movement of a spindle within the shaft.

It is another object of the invention to provide an arrangement enabling a drive gear to be secured to a hollow looptaker shaft with the turn of a set screw and without applying a localized pressure to the shaft under the screw.

Other objects and advantages of the invention will become apparent during a reading of the specification taken in connection with the accompanying drawings.

SUMMARY OF THE INVENTION

A hollow looptaker shaft of a material which would be locally deformable under the pressure of a screw forcibly bearing against it, is provided with a flat exterior surface. A longitudinally split sleeve with a flat interior surface is fitted onto the shaft so as to effect engagement of the flat surfaces one with the other, and prevent relative turning of the sleeve and shaft. A gear is affixed to the sleeve with a set screw extending through the gear to engage the sleeve. The set screw by bearing tightly against the sleeve causes the split sleeve to contract and grip the shaft, the consequence of which is that both the gear and sleeve are prevented from moving relative to the shaft. No deformation of the hollow looptaker shaft occurs and a spindle may move freely within the shaft without interference.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary vertical sectional view taken longitudinally through a sewing machine bed, and showing a rotary looptaker and drive gear assembly according to the invention;

FIG. 2 is an exploaded perspective view showing the said looptaker and drive gear assembly; and

FIG. 3 is a sectional view taken on the plane of the line 3—3 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Referring to the drawings and in particular to FIG. 1, reference character **10** designates the bed of a sewing machine frame carrying a bushing **12** in which a horizontal bed shaft **16** is journalled for rotation. As shown, the bed is formed with an upwardly open looptaker accommodating cavity **18** closed by a slide cover plate **20**. Rotatable in a bushing **22** carried in the bed is a hollow looptaker shaft **24** which depends from the underside of a rotary looptaker **26** disposed in the cavity **18**. The looptaker shaft and rotary looptaker are driven during operation of the sewing machine by a bevel gear **28** made fast on the looptaker shaft with a set screw **30** and sleeve **31** as described hereinafter. Gear **28** meshes with a bevel gear **32** secured by a set screw **34** to the bed shaft **16**.

Constrained within the looptaker is a conventional bobbin case indicated generally at **38**. As shown, the bobbin case is formed with a bearing flange **40** which rests upon a bearing rib **42** of the looptaker and is constrained radially against a bearing shoulder **44**. The bobbin case is held down in the looptaker by a spring arm **46** and is prevented from rotation by suitable means (not shown).

Within a cavity **48** of the bobbin case there is shown a fully rotatable bobbin which is generally indicated at **50**. The bobbin is formed with a depending boss **52** that fits into a central aperture **54** of the bobbin case. The boss **52** is formed with a hexagonal aperture **56** to match the hexagonal extremity **58** of a rotatable spindle **60** extending through hollow shaft **24**. The spindle may be raised to introduce extremity **58** into aperture **56** when it is desired to drive the bobbin to replenish thread thereon. Spindle **60** is part of bobbin thread replenishing mechanism generally indicated by reference character **62**. The bobbin thread replenishing mechanism is of the kind shown, for example, in the aforementioned U.S. Pat. No. 3,693,566.

Gear **28** is attached to the hollow looptaker shaft **24** in the manner of the invention to prevent the shaft from being deformed in the process and interfering with the freedom of movement of the spindle **60** mounted therein. As noted hereinbefore, gear **28** is made fast on the looptaker shaft with set screw **30** and sleeve **31**.

Referring to FIGS. **2** and **3**, it may be seen that the lower end portion of shaft **24** is formed with an exterior planar surface **64**. Sleeve **31** is formed with a matching interior planar surface **66**, and is mounted upon shaft **24** with the surface **66** in engagement with surface **64** to prevent relative rotation of the sleeve and shaft. The sleeve is split radially by a small gap **68** extending longitudinally throughout the entire length of the sleeve and passing centrally through planar surface **66**. An end portion of the sleeve is provided with an exterior planar surface **70** extending substantially parallel to a radial line through the gap **68**. Gear **28** is mounted upon sleeve **31** with set screw **30** extending through the hub portion **72** of the gear and bearing against planar surface **70**. The screw not only secures the gear on the sleeve, but also affixes the sleeve to the shaft by tightening the sleeve about the shaft with some narrowing of gap **68**. The teeth of gear **28** are precisely located in a rotational

sense with respect to the hook point **74** of the rotating looptaker **26** by the engagement of screw **30** with planar surface **70**, and the gear is prevented thereby from slipping around the sleeve to alter the timing of the looptaker relative to a needle during the operation of a sewing machine. Sleeve **31** is of steel or other hard resilient material highly resistant to local deformation under pressure.

The sleeve by distrubuting the force applied by screw **30** around the periphery of hollow shaft **24** prevents indentation of the shaft by the screw, and so permits the use of a greater variety of materials in the construction of the shaft than heretofor possible. More particularly, by reason of the described arrangement, it is now possible, for example, to select a light weight material which can be cast such as zinc or an inexpensive molded plastic for use, and to form the depending shaft **24** and rotary looptaker **26** in a mold with such materials as an integral structure requiring little or no machining.

It is to be understood that the present disclosure relates to a preferred embodiment of the invention which is for purposes of illustration only and is not to be construed as limiting the invention. Numerous alterations and modifications of the structure herein will suggest themselves to those skilled in the art, and all such modifications and alterations which do not depart from the spirit and scope of the invention are intended to be included within the scope of the appended claims.

I claim:

1. In combination, a looptaker for a sewing machine, a hollow drive shaft for the looptaker depending therefrom, a spindle rotatable within the hollow drive shaft, a sleeve on the hollow shaft with a slit extending throughout the length thereof and including an interior flat surface in engagement with an exterior flat surface provided on the drive shaft to prevent relative rotation of the sleeve and shaft, and a gear affixed to the sleeve with a set screw extending through the gear and bearing against an exterior surface on the sleeve to contract the entire sleeve about the drive shaft, the looptaker and shaft being integral and of a cast material, and the sleeve being of a resilient material which is more resistant to local deformation by applied pressure than the material of said looptaker and shaft.

2. The combination of claim **1** wherein the looptaker and shaft are a one-piece cast zinc part.

3. The combination of claim **1** wherein the looptaker and shaft are a one-piece molded plastic part.

4. The combination as set forth in claim **3** wherein the sleeve is of a resilient steel.

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